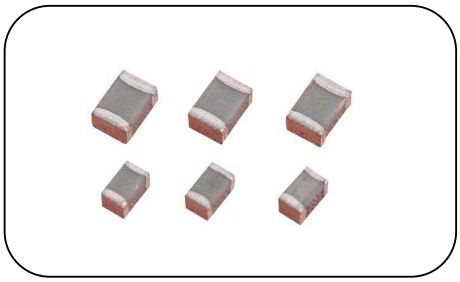
CPTC Thermistor：TPM Type

SMD CPTC Thermistor for Temperature Sensing

■ Features

1. RoHS compliant
2. Thermistor chip with lead-free tinned terminals
3. EIA size 0402,0603,0805
4. Fast and reliable response
5. Suitable for reflow soldering
6. Agency Recognition: UL & cUL



■ Recommended Applications

1. DC/DC converters
2. AC Adapter
3. Inverter
4. Overheat protection for transistor and ICs

■ Part Number Code

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Product Type	
TPM	Thinking CPTC Thermistor TPM Type

Series	
S	Temperature Sensing

Size (EIA)	
0	0402
1	0603
2	0805

Zero Power Resistance at 25℃	
471	470Ω
103	10KΩ
473	47KΩ

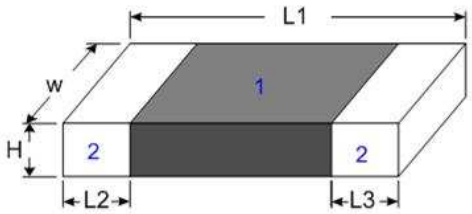
Tolerance of R25	
P	±50%

Sensing Temperature	
105	105℃
115	115℃
125	125℃
130	130℃

Packaging	
R	Reel
B	Bulk

Optional Suffix
001 ~ZZZ

■ Structure and Dimensions



(Unit: mm)

Part No.	Size (EIA)	L1	W	H max.	L2 and L3.
TPM0	0402	1.00±0.15	0.50±0.10	0.6	0.20±0.10
TPM1	0603	1.60±0.15	0.80±0.15	0.95	0.40±0.20
TPM2	0805	2.00±0.20	1.25±0.20	1.2	0.45±0.25

Note1: Material of body: PTC Thermistor Ceramics
Note2: Electrode: Ag-Zn/Ni/Sn

CPTC Thermistor：TPM Type

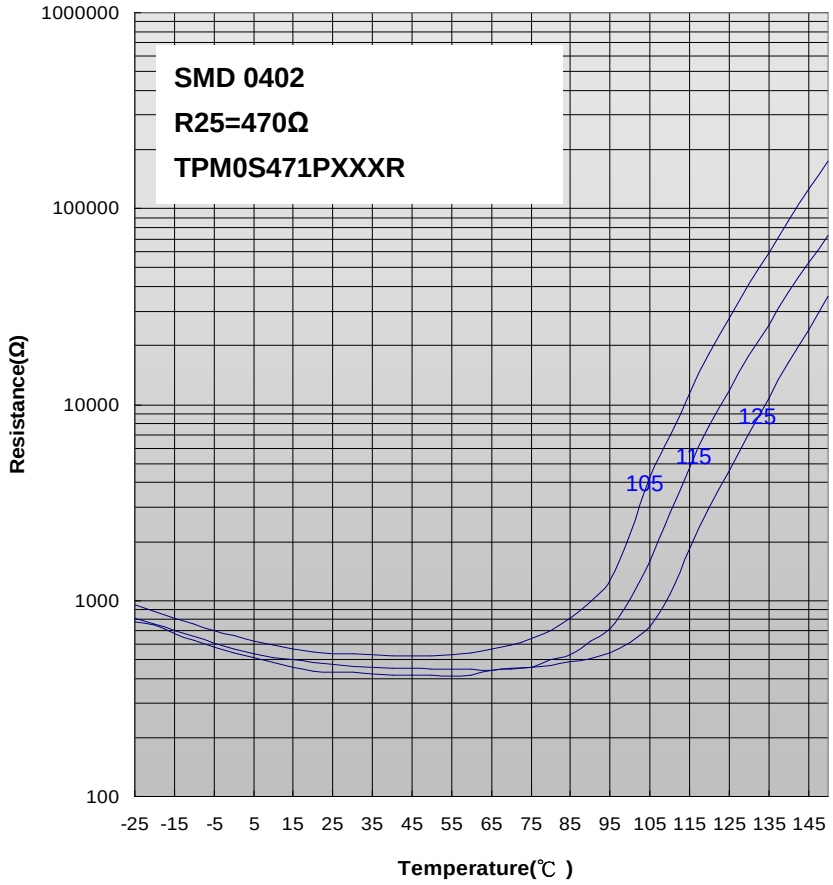
SMD CPTC Thermistor for Temperature Sensing

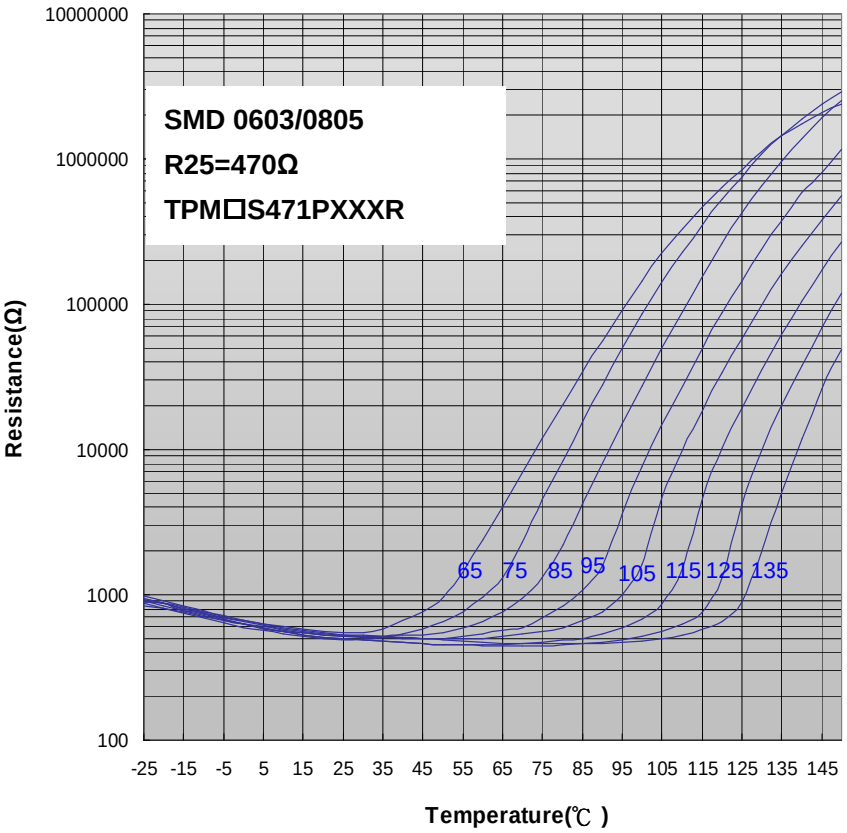
■ Electrical Characteristics

Part No.	Size (EIA)	Sensing Temperature (℃)	Resistance (Ω)			Max. Voltage (V)	Operating Temperature Range(℃)	Safety Approvals	
		Ts	25℃	Ts - 5℃	Ts + 5℃	V_{dc}	T_L~T_U	UL	cUL
TPM0S471P105R	0402	105±5	470	≦4,700	≧4,700	32	-25～+120	√	√
TPM0S471P115R		115±5					-25～+130	√	√
TPM0S471P125R		125±5					-25～+140	√	√
TPM1S471P065R	0603	65±5	470	≦4,700	≧4,700	32	-25～+80	√	√
TPM1S471P075R		75±5					-25～+90	√	√
TPM1S471P085R		85±5					-25～+100	√	√
TPM1S471P095R		95±5					-25～+110	√	√
TPM1S471P105R		105±5					-25～+120	√	√
TPM1S471P115R		115±5					-25～+130	√	√
TPM1S471P125R		125±5					-25～+140	√	√
TPM1S471P135R		135±5					-25～+150	√	√
TPM1S103P110R	0603	110±5	10K	≦4.7M	≧4.7M	32	-25～+125	√	√
TPM1S103P120R		120±5					-25～+135	√	√
TPM1S103P130R		130±5					-25～+145	√	√
TPM1S473P130R		130±5	47K	≦4.7M	≧4.7M		-25～+145	√	√
TPM2S471P065R	0805	65±5	470	≦4,700	≧4,700	32	-25～+80	√	√
TPM2S471P075R		75±5					-25～+90	√	√
TPM2S471P085R		85±5					-25～+100	√	√
TPM2S471P095R		95±5					-25～+110	√	√
TPM2S471P105R		105±5					-25～+120	√	√
TPM2S471P115R		115±5					-25～+130	√	√
TPM2S471P125R		125±5					-25～+140	√	√
TPM2S471P135R		135±5					-25～+150	√	√

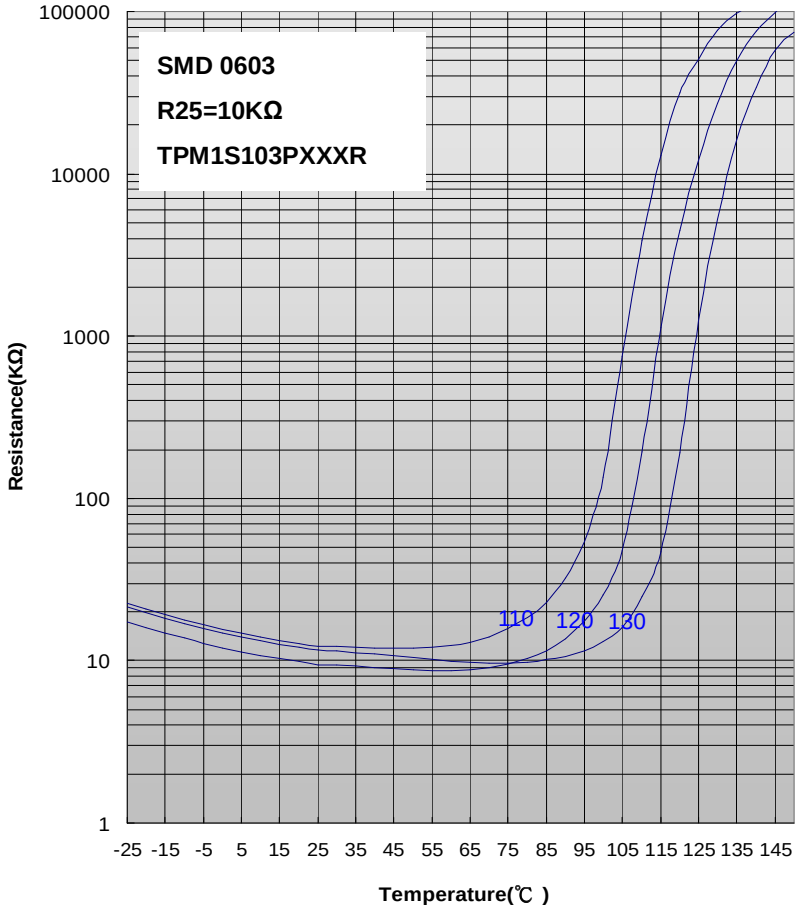
Note: UL&cUL File No. E138827

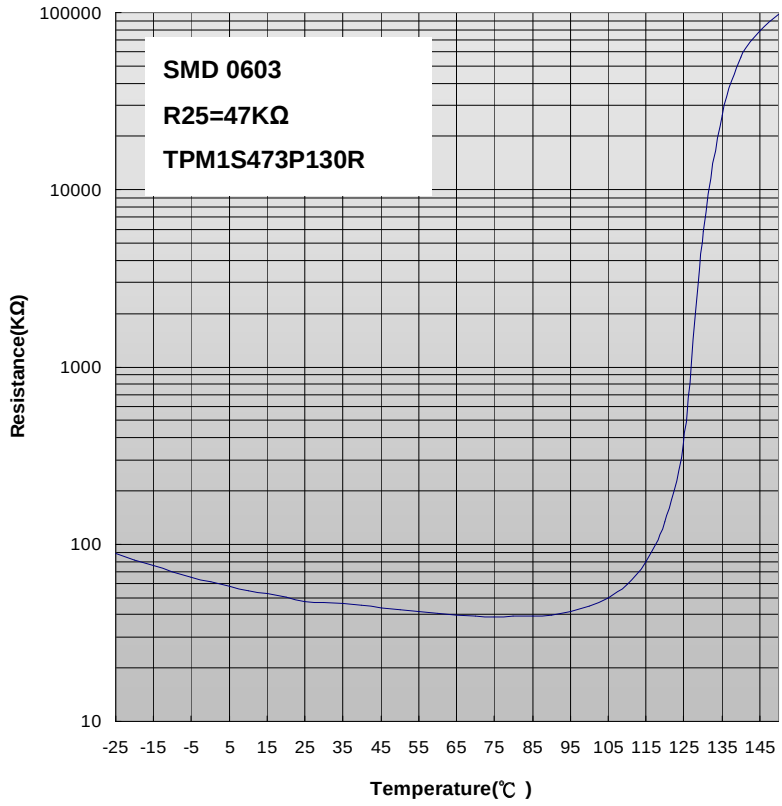
■ Resistance-Temperature Characteristics (Typical)





■ Resistance-Temperature Characteristics (Typical)





■ Typical Application Circuit

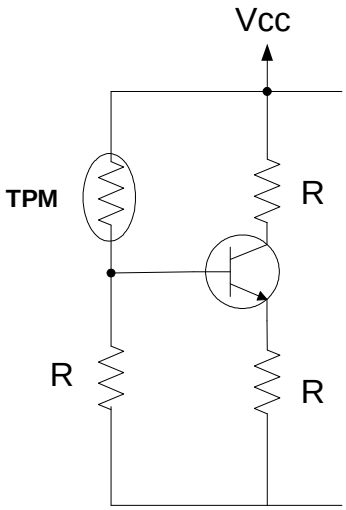


Fig 1. Overheat Protection

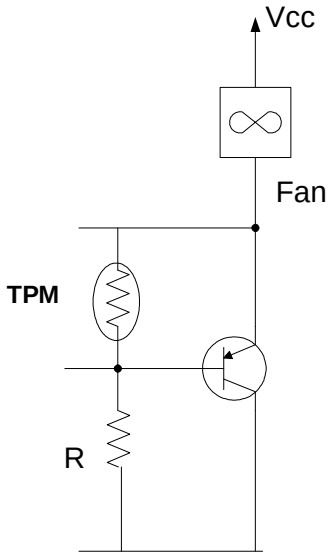


Fig 2. Temp. Sensing and Control

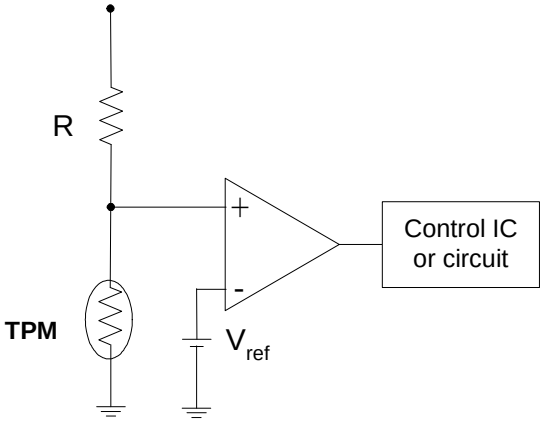
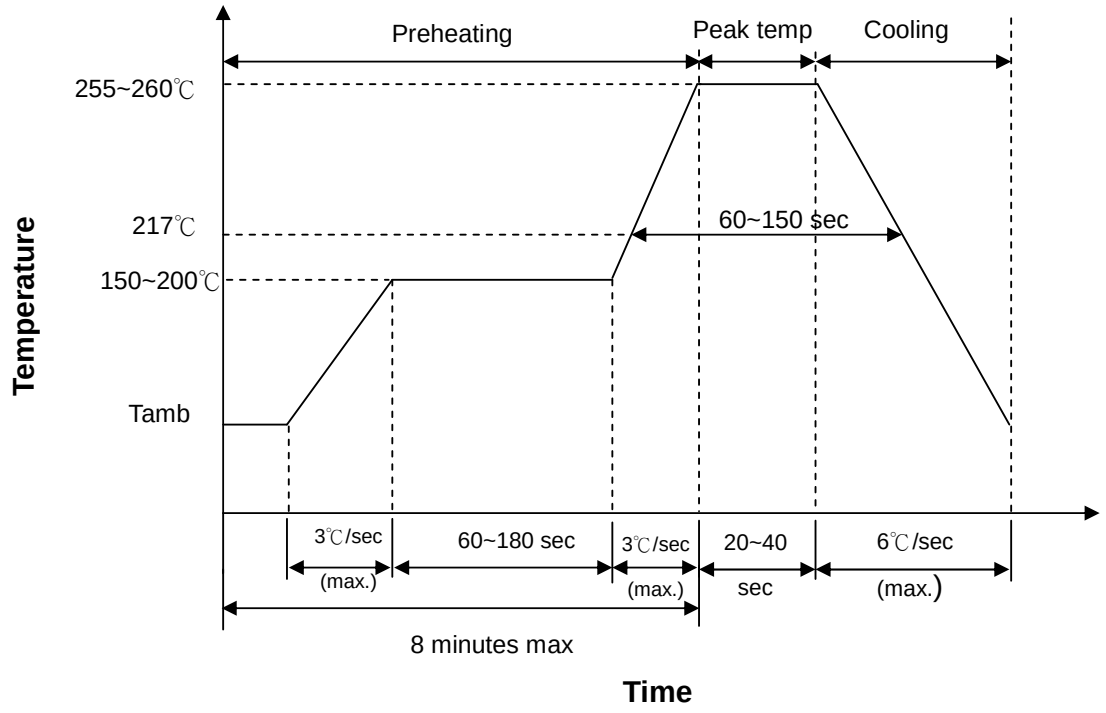


Fig 3. Comparator Circuit

Soldering Recommendation

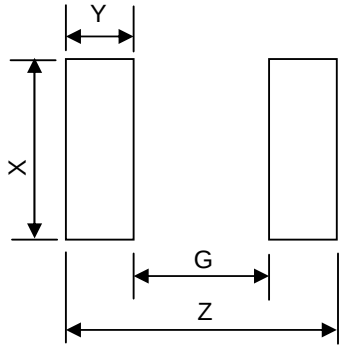
■ IR-Reflow Soldering Profile



■ Reworking Conditions With Soldering Iron

Item	Conditions
Temperature of Soldering Iron-tip	360℃ (max.)
Diameter of Soldering Iron-tip	Φ3mm (max.)
Soldering Time	3 sec (max.)

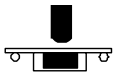
■ Recommended Pad Dimensions



Size	Z (mm)	G (mm)	X (mm)	Y (mm)
0402	2.1~2.2	0.4~0.5	0.6~0.7	0.9~1.0
0603	2.7~2.8	0.6~0.7	0.9~1.0	1.0~1.1
0805	3.1~3.2	0.6~0.7	1.4~1.5	1.2~1.3

Followed Standard:IPC-SM-782A

■ Reliability

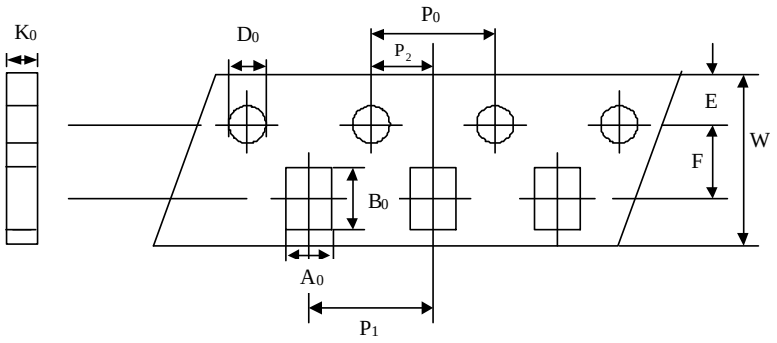
<table>
<tr><th>Item</th><th>Standard</th><th>Test Conditions / Methods</th><th>Specifications</th></tr>
<tr><td>Bending Strength</td><td>IEC-60068-2-21</td><td>Warp 3mm
Speed ＜ 0.5mm/sec.
Duration: 10 sec on PCB.
  </td><td>No visible damage
｜△R25/R25｜≦ 10 %</td></tr>
<tr><td>Damp Heat,
Steady State</td><td>IEC 60068-2-3</td><td>40 ± 2 ℃ , 90 ~ 95% RH , 1000± 24 HRS</td><td>No visible damage
｜△R25/R25｜≦ 20 %
(｜△R25/R25｜≦ 30 % *1)</td></tr>
<tr><td>High Temp. Storage</td><td>IEC 60738-1
IEC 60068-2-2</td><td>Tu. ± 5 ℃ , 1000 ± 24 HRS</td><td>No visible damage
｜△R25/R25｜≦ 20 %
(｜△R25/R25｜≦ 30 % *1)</td></tr>
<tr><td>Rapid Change of Temperature</td><td>IEC 60068-2-14</td><td>The conditions shown below shall be repeated 5 cycles on PCB
<table>
<tr><th>Step</th><th>Temperature (℃)</th><th>Period (minutes)</th></tr>
<tr><td>1</td><td>-25 ± 5</td><td>30 ± 3</td></tr>
<tr><td>2</td><td>Room temperature</td><td>5 ± 3</td></tr>
<tr><td>3</td><td>150 ± 5</td><td>30 ± 3</td></tr>
<tr><td>4</td><td>Room temperature</td><td>5 ± 3</td></tr>
</table></td><td>No visible damage
｜△R25/R25｜≦ 20 %
(｜△R25/R25｜≦ 30 % *1)</td></tr>
<tr><td>High Temp. Load</td><td>IEC 60738-1</td><td>85 ± 5 ℃ Vmax. , 1000 ± 24 HRS</td><td>No visible damage
｜△R25/R25｜≦ 20 %
(｜△R25/R25｜≦ 30 % *1)</td></tr>
</table>

Item	Standard	Test Conditions / Methods	Specifications
Climatic Sequence	IEC 60738-1	a. Tu. x 16 HRS b. 1st cycle : 40 ℃ 95 %RH x 24 HRS c. -25 ℃ x 2 HRS d. 5 cycles : 40℃ 95% RH x 24 HRS / Cycle	No visible damage $\lvert \triangle R_{25}/R_{25} \rvert \leqq 20\ \%$ ($\lvert \triangle R_{25}/R_{25} \rvert \leqq 30\ \%$ *1)
Solderability	IEC 60068-2-2	235 ± 5 ℃ , 2 ± 0.5 sec	At least 95% of terminal electrode is covered by new solder
Resistance to Soldering Heat	IEC 60068-2-2	260 ± 5 ℃ , 10 ± 1 sec	No visible damage $\lvert \triangle R_{25}/R_{25} \rvert \leqq 20\ \%$ ($\lvert \triangle R_{25}/R_{25} \rvert \leqq 30\ \%$ *1)
Low Temp. Storage*1	Specification Standard	-40 ± 3 ℃ , 1000 ± 24 HRS	No visible damage $\lvert \triangle R25/R25 \rvert \leqq 30\ \%$ *1

*1：Apply for TPM1S103□110R , TPM1S103□120R , TPM1S103□130R , and TPM1S473□130R only.

■ Package

● Taping Specification

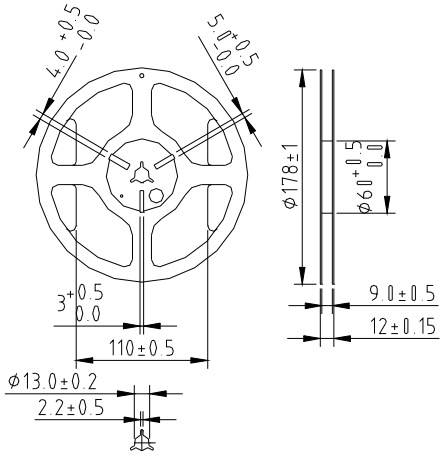


(Unit: mm)

Index / Type	A_0 ±0.05	B_0 ±0.12	W ±0.2	E ±0.1	F ±0.05	P_1 ±0.1	P_2 ±0.05	P_0 ±0.1	D_0 ±0.1	K_0 ±0.1
0402	0.62	1.12	8	1.75	3.5	2	2	4	1.55	0.60

Index / Type	A_0 ±0.2	B_0 ±0.2	W ±0.2	E ±0.1	F ±0.05	P_1 ±0.1	P_2 ±0.05	P_0 ±0.1	D_0 ±0.1	K_0 ±0.1
0603	1.1	1.9	8	1.75	3.5	4	2	4	1.55	0.95
0805	1.5	2.3	8	1.75	3.5	4	2	4	1.55	0.95

- Quantity



Type	Quantity(pcs/reel)
0402	10000
0603	4000
0805	3500

■ Storage Condition of Products

- Storage Conditions :
  1. Storage Temperature: -10℃~+40℃
  2. Relative Humidity: ≦75%RH
  3. Keep away from corrosive atmosphere and sunlight.
- Period of Storage : 1 year

■ Cross Reference

Size (EIA)	R25	Sensing Temperature Ts (℃)	THINKING Part Number	Murata Part Number	EPCOS Part Number
0402	470Ω	105±5	TPM0S471P105R	PRF15BC471QB1RC	----
		115±5	TPM0S471P115R	PRF15BB471QB1RC	----
		125±5	TPM0S471P125R	PRF15BA471QB1RC	----
0603	470Ω	65±5	TPM1S471P065R	PRF18BG471QB1RB	----
		75±5	TPM1S471P075R	PRF18BF471QB1RB	B59601A075A062
		85±5	TPM1S471P085R	PRF18BE471QB1RB	B59601A0085A062
		95±5	TPM1S471P095R	PRF18BD471QB1RB	B59601A0095A062
		105±5	TPM1S471P105R	PRF18BC471QB1RB	B59601A0105A062 B59601A0110A062(OLD PART)
		115±5	TPM1S471P115R	PRF18BB471QB1RB	B59601A0115A062 B59601A0120A062(OLD PART)
		125±5	TPM1S471P125R	PRF18BA471QB1RB	B59601A0125A062 B59601A0130A062(OLD PART)
		135±5	TPM1S471P135R	PRF18AR471QB1RB	B59601A0135A062
	10KΩ	110±5	TPM1S103P110R	----	----
		120±5	TPM1S103P120R	----	----
		130±5	TPM1S103P130R	PRF18BA103QB1RB	----
	47KΩ	130±5	TPM1S473P130R	PRF18BA473QB1RB	----
0805	470Ω	65±5	TPM2S471P065R	-----	B59701A0070A062
		75±5	TPM2S471P075R	-----	-----
		85±5	TPM2S471P085R	PRF21BE471QB1RA	B59701A0090A062
		95±5	TPM2S471P095R	PRF21BD471QB1RA	B59701A0100A062
		105±5	TPM2S471P105R	PRF21BC471QB1RA	B59701A0110A062
		115±5	TPM2S471P115R	PRF21BB471QB1RA	B59701A0120A062
		125±5	TPM2S471P125R	PRF21BA471QB1RA	B59701A0130A062
		135±5	TPM2S471P135R	PRF21AR471QB1RA	-----